133. The liquid crystal device according to claim 31 wherein said liquid crystal layer does not have a memory characteristics.

134. The liquid crystal device according to claim 32 wherein said liquid crystal layer does not have a memory characteristics.

87 cont.

135. The liquid crystal device according to claim 33 wherein said liquid crystal layer does not have a memory characteristics. --

REMARKS

Applicants wish to thank the Examiner for the very thorough consideration given the present application.

The Office Action of ***July 27, 2001*** has been received and its contents carefully noted. Filed concurrently herewith are a *Request for Continued Examination* and a *Request for a Two (2) Month Extension of Time* that extends the shortened statutory period for response to ***December 27, 2001***. Accordingly, Applicants respectfully submit that this response is timely filed.

Claims 31-33, 38, 39, 46-51, 55-58, 65-70, 83-94, 109, 110, and 115-117 were pending in the present application prior to the aforementioned amendment. By the above actions, claims 31-33, 55, 56, 67, 69, 109, 116, and 117 have been amended, claims 68 and 70 have been deleted, and claims 118-135 have been added. Accordingly, claims 31-33, 38-39, 46-51, 55-58, 65-67, 69, 83-94, 109, 110 and 115-135 are now pending herein, and, of which claims 31-33, 55, 56, 67, 69, 109, 116, 117 and 128 are independent, and, for the reasons set forth in detail below, are believed to be in condition for allowance. Please note, the Examiner appears to have looked over dependent claims 84, 88 and 92. These claims remain pending and are believed to be in condition for allowance.

Claim Rejections - 35 U.S.C. §112

Claims 31-33, 38-39, 46-51, 55-58, 65-70, 83, 85-87, 89, 90-91, 93-94, 109-110 and 115-117 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

With respect to the 112, second paragraph rejection, the claims are clear even if the exact location of the resin with respect to the liquid crystal layer is not recited in the claims. The Applicants respectfully submit that it is enough for the purpose of satisfying the rejection under §112, second paragraph, to state that the resin is disposed between the pair of substrates.

Double Patenting Rejection

Claims 31-33, 38-39, 46-51, 55-58, 65-70, 83, 85-87, 89, 90-91, 93-94, 109-110 and 115-117 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2-4 and 17-19 of U.S. Patent No. 5,594,569 as stated in the previous Office Action.

In addition, the amended claims recite a process limitation that the resin is separated from a mixture of the liquid crystal and an curable resin disposed between the substrates. Applicants respectfully submit that this feature distinguishes the present invention from the '569 patent and is sufficient to overcome the double patenting rejection.

Also, please note that the specification supports the limitation that the orientation film is formed over "at least one" of the substrates in page 19, lines 29-30, for example. Also, with respect to the limitation of the electrode provided over "at least one" of the substrates, both of the upper and lower substrates are provided with electrodes in accordance with the embodiments of the present invention. Additionally, the Applicants' present invention covers a device in which only one of the substrates is provided with electrodes.

Conclusion

Having responded to all rejections set forth in the outstanding non-final Office Action, it is submitted that the claims are now in condition for allowance. An early and favorable Notice of Allowance is respectfully solicited. In the event that the Examiner is of the opinion that a brief telephone or personal interview will facilitate allowance of one or more of the above claims, the Examiner is courteously requested to contact Applicants' undersigned representative.

Respectfully submitted,

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MARKED-UP VERSION
OF THE AMENDED CLAIMS

31. (Twice Amended) A liquid crystal device comprising:

a pair of substrates;

a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates[, said liquid crystal layer not having a helical structure of said ferroelectric liquid crystal between said substrates];

[a grain comprising] a resin disposed between the pair of substrates;

an electrode provided over [each] at least one of said substrates for applying an electric field to said ferroelectric liquid crystal; and

an orientation film provided over at least one of said substrates,

[wherein said liquid crystal layer does not have memory characteristic, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other] wherein said resin is formed by disposing a mixture of the liquid crystal and a curable resin between the pair of substrates and curing said curable resin.

32. (Amended) A liquid crystal device comprising:

a pair of substrates;

a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates[, said liquid crystal layer not having a helical structure of said ferroelectric liquid crystal between said substrates];

[a grain comprising] a resin disposed between the pair of substrates;

an electrode provided over [each] at least one of said substrates for applying an electric field to said ferroelectric liquid crystal; and

an orientation film provided over at least one of said substrates,

[wherein said liquid crystal layer does not have bistability, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other] said resin is formed by disposing a mixture of the liquid crystal and a curable resin between the pair of substrates and curing said curable resin and

intensity of light transmitted through the liquid crystal layer can be continuously changed in accordance with a strength of the electric field in an operation of the liquid crystal device.

33. (Twice Amended) A liquid crystal device comprising:

a pair of substrates;

a liquid crystal layer comprising a antiferroelectric liquid crystal provided between said substrates[, said liquid crystal layer not having a helical structure of said antiferroelectric liquid crystal between said substrates];

[a grain comprising] a resin disposed between the pair of substrates;

an electrode provided over [each] at least one of said substrates for applying an electric field to said antiferroelectric liquid crystal; and

an orientation film provided over at least one of said substrates,

wherein said resin is formed by disposing a mixture of the liquid crystal and a curable resin between the pair of substrates and curing said curable resin [said liquid crystal layer does not have memory characteristic, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other].

55. (Twice Amended) A liquid crystal device comprising:

a pair of substrates;

a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates[, said liquid crystal layer not having a helical structure of said ferroelectric liquid crystal between said substrates];

[a grain comprising] a resin disposed between the pair of substrates;

an electrode provided over [each] at least one of said substrates for applying an electric field to said ferroelectric liquid crystal;

an orientation film provided over at least one of said substrates; and

a spacer provided between said substrates,

wherein said resin is formed by disposing a mixture of the liquid crystal and a curable resin between the pair of substrates and curing said curable resin [said liquid crystal layer does not have memory characteristic, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other].

56. (Twice Amended) A liquid crystal device comprising:

a pair of substrates;

a liquid crystal layer comprising an antiferroelectric liquid crystal provided between said substrates[, said liquid crystal layer not having a helical structure of said antiferroelectric liquid crystal between said substrates];

[a grain comprising] a resin disposed between the pair of substrates;

an electrode provided over [each] at least one of said substrates for applying an electric field to said antiferroelectric liquid crystal;

an orientation film provided over at least one of said substrates;

a spacer provided between said substrates,

wherein said resin is formed by disposing a mixture of the liquid crystal and a curable resin between the pair of substrates and curing said curable resin [said liquid crystal layer does not have memory characteristic, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other].

67. (Twice Amended) A liquid crystal device comprising:

a pair of substrates;

a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates[, said liquid crystal layer not having a helical structure of said ferroelectric liquid crystal between said substrates]; and

[a grain comprising] a resin disposed between the pair of substrates;

a pixel comprising a transparent pixel electrode provided between said substrates,

wherein transmitted light amount of said pixel takes a halftone without occurrence of a domain, and

wherein said resin is formed by disposing a mixture of the liquid crystal and a curable resin between the pair of substrates and curing said curable resin [said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other].

69. (Twice Amended) A liquid crystal device comprising:

a pair of substrates;

a liquid crystal layer comprising an antiferroelectric liquid crystal provided between said substrates[, said liquid crystal layer not having a helical structure of said antiferroelectric liquid crystal between said substrates]; and

[a grain comprising] a resin disposed between the substrates;

a plurality of pixels each comprising a transparent pixel electrode provided between said substrates,

wherein transmitted light amount of each of said pixels takes a halftone without occurrence of a domain, and

wherein [said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other] said resin is formed by disposing a mixture of the liquid crystal and a curable resin between the pair of substrates and curing said curable resin.

109. (Twice Amended) A liquid crystal device comprising:

a pair of substrates;

a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates;

[a grain comprising] a resin disposed between the pair of substrates;

an electrode provided over [each] at least one of said substrates for applying an electric field to said ferroelectric liquid crystal; and

an orientation film provided over at least one of said substrates,

wherein [said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other] said resin is formed by disposing a mixture of the liquid crystal and a curable resin between the pair of substrates and curing said curable resin, and

wherein transmitted light amount of said liquid crystal layer continuously varies in response to voltage applied to said liquid crystal layer.

116. (Twice Amended) A method for forming a liquid crystal device comprising:

forming an orientation film over at least one of a pair of substrates [each having an electrode];

[rubbing said orientation film;]

disposing said substrates to oppose said substrates to each other;

injecting a mixture comprising a liquid crystal material and an uncured resin between the opposed substrates [after said rubbing]; and

curing said uncured resin after said injecting to provide a cured resin [between said liquid crystal material and said orientation film],

wherein said liquid crystal device comprises a pixel whose transmitted light amount takes a halftone.

117. (Twice Amended) A liquid crystal device comprising:

a pair of substrates;

a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates,

an electrode provided over [each] at least one of said substrates;

an orientation film provided over [each] at least one of said substrates; and

[a grain comprising] a resin disposed between the pair of substrates,

wherein said ferroelectric liquid crystal does not have helical structure between said substrates,

wherein said ferroelectric liquid crystal does not produce domain, and

wherein transmitted light amount of said liquid crystal layer continuously varies in response to voltage applied to said liquid crystal layer, and said resin is formed by disposing a mixture of the liquid crystal and a curable resin between the pair of substrates and curing said curable resin.

[wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.]